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## PATENT ABSTRACTS OF JAPAN

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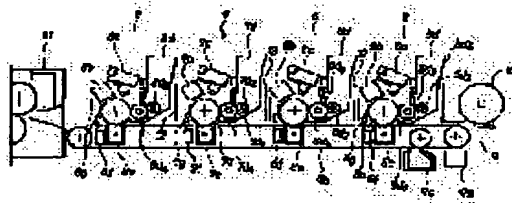
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(54) COLOR IMAGE FORMING DEVICE

## (57)Abstract:

PURPOSE: To present a color image forming device, which has high reliability about function thereof and which can always form image at high quality, and furthermore, which can be made compact.

CONSTITUTION: Multiple image forming units 5-8, which has a latent image holding body 5a, a static latent image forming means 5c for forming a static latent image on the surface of the latent image holding body 5a, a developing means 5d for making toner to be adhered to the surface of the static latent image to form a toner image, and a copying means 5e for copying the toner image to the copying material, are arranged continuously to form a color image forming device, in which the toner image formed per each image forming unit 5-8 is copied to the surface of the carried copying material in order by the copying means 5e-8e to form color image. In this color image forming device, at least one of the image forming units 5-8 is structured to a cleanerless image forming unit 5, in which the residual toner left on the surface of the latent image holding body 5a after copying is cleaned by the developing means 5c simultaneously with developing.



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**CLAIMS**

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[Claim(s)]

[Claim 1] A latent-image supporter, electrostatic latent-image means forming which forms an electrostatic latent image in said latent-image supporter surface, Image formation unit plurality which has a development means to make a toner adhere to said electrostatic latent-image side, and to form a toner image in it, and an imprint means to imprint said toner image to imprint material is arranged continuously. It is color picture formation equipment which carries out a sequential imprint and forms a color picture in an imprint material side which has a toner image formed for said every image formation unit conveyed with an imprint means. Color picture formation equipment characterized by being the cleaner loess image formation unit constituted so that the imprint remaining toner with which at least one of said image formation unit remains to a latent-image supporter side after an imprint might be cleaned with a development means.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]**

**[0001]**

**[Industrial Application]** This invention relates to the color picture formation equipment which was applied to color picture formation equipment, especially attained the miniaturization by the attachment of a cleaner loess image formation unit.

**[0002]**

**[Description of the Prior Art]** Two or more image formation units are arranged continuously, and the color picture formation equipment which carries out the sequential imprint of the toner image formed for every image formation unit with an imprint means in the imprint material side conveyed, and forms a color picture is known. Drawing 3 shows the configuration of the color-picture formation section in cross section among the scanner section for the manuscript read currently arranged in the important section of the configuration of this kind of color-picture formation equipment, i.e., the main part of color-picture formation equipment, the image-processing section which processes electrically the picture signal outputted as a digital signal from this scanner section, and the color-picture formation section which are based on the image information of each color by this image-processing section, and copy and reproduce a necessary image. And this color picture formation section consists of the image formation unit 1 for blacks, an image formation unit 2 for yellow, an image formation unit 3 for Magentas, and an image formation unit 4 for cyanogen.

**[0003]** Moreover, the configuration of each of these image formation units 1, 2, 3, and 4 All The latent-image supporters (for example, photo conductor drum) 1a, 2a, 3a, and 4a, Said latent-image supporters 1a, 2a, 3a, and 4a Electrification means (for example, corona-electrical-charging machine) 1b which electrifies a field uniformly, 2b, and 3b and 4b, Latent-image supporters 1a, 2a, 3a, and 4a charged based on the image information from said image-processing section The electrostatic latent-image means forming 1c, 2c, 3c, and 4c which forms a necessary electrostatic latent image in a field, Development means 1d, 2d, 3d, and 4d to supply a toner to said electrostatic latent-image side, and to form an electrostatic latent image into a toner image, They are the latent-image supporters 1a, 2a, 3a, and 4a about imprint means (electrification machine for an imprint) 1e, 2e, 3e, and 4e to make an imprint material side imprint said toner image, and the imprint remaining toner which remained by said imprint. The configuration of having provided cleaning means 1f, 2f, 3f, and 4f to remove from a field is accomplished. That is, although the coloring toner to be used is changed, the configuration which arranged continuously common image formation equipment with [ so-called ] a cleaning means (unit) is taken (publication number 1-112267 number official report etc.). According to this color picture formation equipment, first, in the image formation unit 1, the electrostatic latent image of a black component color is formed in latent-image supporter 1a, is developed by the toner image of black, and is imprinted by the imprint material side. Subsequently, in the image formation unit 2, the electrostatic latent image of a yellow component color is formed in latent-image supporter 1a, and the imprint material side developed and conveyed by the toner image of yellow imprints in laminating. It will pass through the same process one by one below, and a necessary color picture will be copied and recorded.

[0004]

[Problem(s) to be Solved by the Invention] However, in the case of the color picture formation equipment of the above-mentioned configuration, there are the practically following problems. That is, while it has the outstanding image formation function also in this kind of color picture formation equipment, miniaturization of color picture formation equipment including the image formation section is desired. However, in the case of the color picture formation equipment of the above-mentioned configuration, two or more image formation units 1, 2, 3, and 4 of each which constitute the image formation section which accomplishes an important section are all the cleaning means 1f, 2f, 3f, and 4f. With, since the occupancy capacity of each image formation units 1, 2, 3, and 4 is also comparatively large, it is the trouble of miniaturization. That is, since the big imprint remaining toner recovery depot of capacity is comparatively required inevitably in order to collect extensively the imprint remaining toners which remain after imprinting to fields, such as latent-image supporter (drum) 1a, and to achieve the function to clean, said cleaning means 1f, 2f, 3f, and 4f are the cleaning means 1f, 2f, 3f, and 4f. The miniaturization of the actual condition is unescapable. If it takes into consideration that the imprint of the imprint remaining toner to an imprint material side increases comparatively in response to effect with the humidity of the external world etc. when copying and forming many images continuously especially or, there will be a limit also in the miniaturization of the imprint remaining toner recovery depot, and it will become the neck of miniaturization of the image formation section.

[0005] This invention coped with the above-mentioned situation, was made, and aims functional at offer of the color picture formation equipment in which it is reliable and the image of high quality not only always being formed but miniaturization is possible.

[0006]

[Means for Solving the Problem] Electrostatic latent-image means forming by which color picture formation equipment concerning this invention forms an electrostatic latent image in a latent-image supporter and said latent-image supporter surface, Image formation unit plurality which has a development means to make a toner adhere to said electrostatic latent-image side, and to form a toner image in it, and an imprint means to imprint said toner image to imprint material is arranged continuously. It is color picture formation equipment which carries out a sequential imprint and forms a color picture in an imprint material side which has a toner image formed for said every image formation unit conveyed with an imprint means. It is characterized by being the cleaner loess image formation unit constituted so that the imprint remaining toner with which at least one of said image formation unit remains to a latent-image supporter side after an imprint might be cleaned with a development means.

[0007]

[Function] According to above-mentioned this invention, by having considered as the cleaner loess image formation unit constituted so that the imprint remaining toner which remains to the latent-image supporter side after an imprint in at least one of an image formation unit might be cleaned with a development means, the image formation section is miniaturized and the miniaturization of color picture formation equipment itself can be attained. That is, in order that at least one in an image formation unit may accomplish the configuration of development and coincidence cleaning and it may not install a cleaning means separately, it can omit the spatial capacity which the cleaning means occupies. And in said cleaner loess image formation unit, since the reuse also of the imprint remaining toner is collected and carried out to a toner tank, use of an efficient toner is achieved.

[0008]

[Example] With reference to drawing 1 and drawing 2, the example of this invention is explained below.

[0009] In cross section, drawing 2 expands one (cleaner loess image formation unit) of the image formation section, and shows the example of an important section configuration (image formation section) of the color picture formation equipment which drawing 1 requires for this invention in cross section again. This image formation section consists of the cleaner loess image formation unit 5 for yellow, a cleaner loess image formation unit 6 for Magentas, a cleaner loess image formation unit 7 for cyanogen, and a cleaner loess image formation unit 8 for blacks. Moreover,

the configuration of each of these cleaner loess image formation units 5, 6, 7, and 8 All The latent-image supporters (for example, photo conductor drum) 5a, 6a, 7a, and 8a, Said latent-image supporters 5a, 6a, 7a, and 8a Electrification means (for example, corona-electrical-charging machine) 5b, 6b, 7b, and 8b to electrify a field uniformly, Latent-image supporters 5a, 6a, 7a, and 8a charged based on the image information from the image-processing section (not shown) currently installed separately Electrostatic latent-image means forming 5c, 6c, 7c, and 8c which forms a necessary electrostatic latent image in a field (print head), To said electrostatic latent-image side, for example, development means 5d, 6d, 7d, and 8d to supply a 1 component nonmagnetic toner and to form an electrostatic latent image into a toner image, Imprint means (electrification machine for an imprint) 5e, 6e, 7e, and 8e to make an imprint material side imprint said toner image, Said imprint means 5e, 6e, 7e, and 8e Latent-image supporters 5a, 6a, 7a, and 8a after imprinting a toner image The electric discharge lamps 5f, 6f, 7f, and 8f from which the charge which remains to a field is removed (elimination), And they are the latent-image supporters 5a, 6a, 7a, and 8a about the imprint remaining toner which remained by said imprint. It decentralizes in a field and they are said electrification means 5b, 6b, 7b, and 8b. While contributing to the entropy of electrification to depend Development means 5d, 6d, 7d, and 8d The configuration of having provided the decentralization means 5g, 6g, 7g, and 8g of the imprint remaining toner which promotes a cleaning action is accomplished. That is, although the coloring toner to be used is changed, the configuration which arranged continuously the so-called cleaner loess image formation equipments (unit) 5, 6, 7, and 8 is taken.

[0010] In addition, it is an imprint material conveyance means to convey the imprint material to which 9 imprints a toner image in drawing 1 . For example, the transfer paper supplied by said image formation being interlocked with from the feed roller 10 Rolling-mechanisms (roller etc.) 9b which carries out sequential conveyance and which runs endless transparent endless-like belt 9a and this belt 9a substantially, It consists of 9d of belt electrification machines which give electrification of business to belt-cleaner 9c and belt 9a it runs which cleans the belt 9a page it runs. Moreover, the fixing unit fixed to a transfer paper side in the toner image with which 11 was imprinted by said transfer paper, and 12 are each cleaner loess image formation units 5, 6, and 7 and a batch object between eight.

[0011] Development means 5d, 6d, 7d, and 8d in the cleaner loess image formation units 5, 6, 7, and 8 which accomplish the component of the color picture formation equipment concerning this invention If a configuration and a function are explained Latent-image supporters 5a, 6a, 7a, and 8a 5d of toner support of the roller mold which supports a toner layer to the peripheral surface which was confronted with the field and has been arranged 1, 6d 1, 7d1, 8d1, and 5d of this toner support 1 and 6d1, 7d1 and 8d1 5d of toner supply objects which supply a toner to a field 2 and 6d2, 7d 2, 8d2, and the 5d of the aforementioned toner support 1, 6d1, and 7d1, 8d1 Toner layer regulation blade 5d3 which regulate the thickness of the toner layer supported by the field, 6d3, 7d3, 8d3, and the above-mentioned latent-image supporters 5a, 6a, 7a, and 8a 5d of toner support after supplying a toner to an electrostatic latent-image side 1, 6d1, 7d1, and 8d1 Toner recovery blade 5d4 which collect the toners of a field, 6d4, 7d4, and 8d4 And toner tank 5d5 which store a toner while equipping with these, 6d5, 7d5, and 8d5 It provides.

[0012] Next, an outline is explained about the development and coincidence cleaning in these cleaner loess image formation units 5, 6, 7, and 8. Electrostatic latent-image means forming 5c, 6c, 7c, and 8c Latent-image supporters 5a, 6a, 7a, and 8a When an electrostatic latent image is formed in a field, The imprint remaining toner which exists in a part for a live part (namely, the unexposed section or the non-image section) Electrification means 5b, 6b, 7b, and 8b Since it is charged certainly, toner support 5d1, 6d1, 7d1, and 8d1 from — latent-image supporters 5a, 6a, 7a, and 8a the electric field which control that a toner 2 transfers to a field — Namely, the potential for a live part, toner support 5d1, 6d1, 7d1, and 8d1 It is 1, 6d1, 7d1, and 8d1 5d of toner support by the electric field by the potential difference with potential. It transfers to a side. the imprint remaining toner which exists in coincidence at a part for a non-live part, i.e., the exposure section, and the image section — toner support 5d1, 6d1, 7d1, and 8d1 from — latent-image supporters 5a, 6a, 7a, and 8a the force of going — winning popularity — latent-image supporters (photo conductor) 5a, 6a, 7a, and 8a It remains on a field. a part for this non-live part

— the toner support five a1, six a1, seven a1, and eight a1 from — a new toner transfers and development, simultaneously cleaning are performed.

[0013] According to the color picture formation equipment of the above-mentioned configuration, first, a necessary electrostatic latent-image pattern is formed in latent-image supporter (photo conductor) 5a page of the information corresponding to a yellow image, development and coincidence cleaning are performed by operation principle which was described above with 1d of development means of the next step, and the toner image corresponding to the aforementioned electrostatic latent-image pattern is formed in latent-image supporter 5a page. Thus, the formed toner image is imprinted by the imprint material side conveyed synchronous by imprint means 5e from latent-image supporter 5a page. After this imprint, after latent-image supporter 5a page is irradiated by electric discharge lamp 5f and electrification is removed, homogeneity distributes mostly by 5g of decentralization means of the imprint remaining toner, latent-image supporter 5a page entropy is attained, and formation of the electrostatic latent-image pattern corresponding to a yellow image, development, coincidence cleaning, etc. are repeated again.

[0014] On the other hand, the imprint material by which said yellow image was imprinted is conveyed to the cleaner loess image formation unit 6 side for the following Magentas, and imprints a necessary Magenta image in laminating on the imprint material side where the aforementioned yellow image was imprinted by the actuation thru/or actuation which applied correspondingly case [ in the cleaner loess image formation unit 5 for yellow ]. Below, one by one, after performing the formation of a toner image of the color image which corresponds in the cleaner loess image formation unit 7 for cyanogen, and the cleaner loess image formation unit 8 for blacks, and an imprint, it is established in the fixing unit 11 and a necessary color picture is obtained.

[0015] At the image formation production process in said each image formation units 5, 6, 7, and 8 Although the so-called cleaning means is not installed separately, they are said development means 5d, 6d, 7d, and 8d. By the development and coincidence cleaning to depend Latent-image supporters 5a, 6a, 7a, and 8a Since the imprint remaining toner of a field is eliminated easily and certainly, color-mixture-izing, image gap, etc. of each color are canceled, it is clear (sharp) and a quality color picture is always formed. [ a toner image ]

[0016] In addition, what is necessary is just to let at least one piece be the cleaner loess image formation unit 5 by this invention in the color picture formation equipment of the above-mentioned configuration, although each image formation units of all were made into the cleaner loess image formation units 5, 6, 7, and 8. For example, the image formation unit most located in the upstream along the flow direction of imprint material is made into the cleaner loess image formation unit 5 for yellow, and others are good also as an image formation unit with the cleaning means of dedication, and can avoid the effect of color-mixture-izing more effectively in this case. Or the image formation unit most located in the downstream along the flow direction of imprint material is made into the cleaner loess image formation unit 8 for blacks. Others are good also as an image formation unit with the cleaning means of dedication (or an image formation unit and a cleaner loess image formation unit with the cleaning means of dedication). Toner tank 8d5 of the cleaner loess image formation unit 8 for blacks by this configuration It can be used for formation of a monochrome image by enlarging capacity comparatively. Moreover, the image formation unit most located in the downstream along the flow direction of imprint material is made into the image formation unit with a cleaning means for yellow, or the image formation unit with a cleaning means for cyanogen, it is good also as a cleaner loess image formation unit, and, as for others, also in this configuration, the effect of color-mixture-izing can be avoided more effectively.

[0017] Anyway, in the color picture formation equipment concerning this invention, although the property of the toner used properly or (monochrome, color, etc.) used etc. is taken into consideration and arrangement and the location of each image formation unit are chosen and set up suitably, it is necessary to arrange at least one cleaner loess image formation unit. That is, it is the functional side which forms a color picture, and the point of miniaturization, and is because the early purpose cannot be attained.



[0018] Moreover, with the color picture formation equipment of the above-mentioned configuration, they are the electric discharge lamps 5f, 6f, 7f, and 8f to the inside of belt 9a of the shape of endless [ transparent ] substantially. Although it arranges, in this invention, it is not limited to this configuration, and they are the electric discharge lamps 5f, 6f, 7f, and 8f. It arranges on the outside of endless-like belt 9a, and is good also as opaque in endless-like belt 9a. However, by taking a configuration which was described above, the efficient arrangement using the inside of endless-like belt 9a is attained, and much more miniaturization of color picture formation equipment can be realized.

[0019]

[Effect of the Invention] According to the color picture formation equipment applied to this invention as explained above, high degree of accuracy thru/or since electrostatic latent-image formation, coincidence development, and toner recovery and cleaning of the non-image section can be made proper, it is sharp thru/or clear and simplification of the cleaning means of the imprint remaining toner, and the simplification and the miniaturization of a configuration by this are not only attained effectively, but can form the color picture of high quality.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]** The cross section showing the example of an important section configuration of the color picture formation equipment concerning this invention.

**[Drawing 2]** The cross section expanding and showing the cleaner loess image formation unit in the example of an important section configuration of the color picture formation equipment concerning this invention.

**[Drawing 3]** The cross section showing the important section configuration of conventional color picture formation equipment.

**[Description of Notations]**

1, 2, 3, 4 — Image formation unit 1a, 2a, 3a, 4a, 5a, 6a, 7a, and 8a — Latent-image supporter 1b, 2b, and 3b, 4b, 5b, 6b, 7b and 8b — electrification means 1c, 2c, 3c, 4c, 5c, 6c, 7c, and 8c — electrostatic latent-image means forming 1d, 2d, 3d, 4d, 5d, 6d, 7d, and 8d — development means 1e, 2e, 3e, 4e, 5e, 6e, 7e, and 8e — imprint means 1f, 2f, 3f, and 4f — cleaning means 5f and 6f, 7f, and 8f — electric discharge lamp 5g, 6g, 7g, and 8g — Decentralization means of the imprint remaining toner 5, 6, 7, 8 — Cleaner loess image formation unit 5d1, 6 d1, 7 d1, and eight d1 — 5d of toner support 2, 6 d2, and 7 d2, 8d2 — Toner supply object 5d 3 and 6d3, 7d3 and 8 d3 — toner layer regulation blade 5d 4, 6 d4, and 7 d4, 8d4 — Toner recovery blade 5d 5 and 6d5, 7d5 and 8 d5 — toner tank 9 — imprint material conveyance means 9a— belt 9b— rolling mechanism 9c— belt cleaner 9d— belt electrification machine 10 — feeding roller 11 — fixing unit 12 — Batch object between cleaner loess image formation units

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**[Translation done.]**

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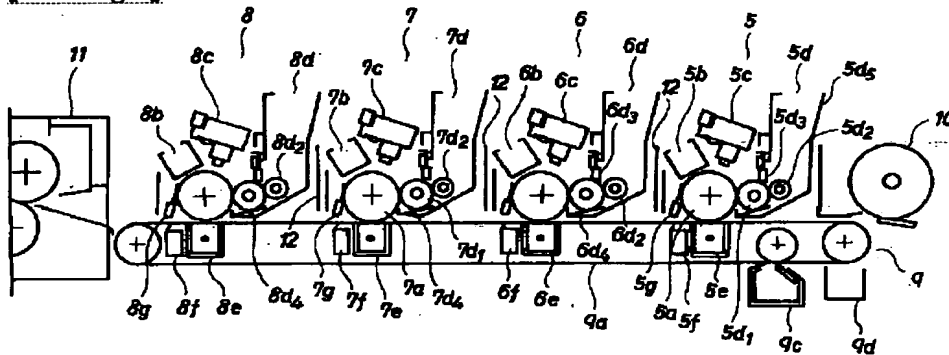
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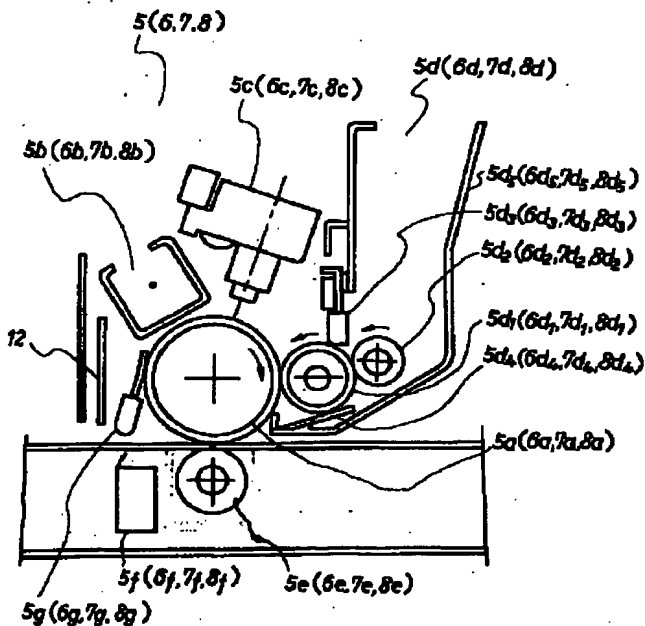
## DRAWINGS

[Drawing 1]

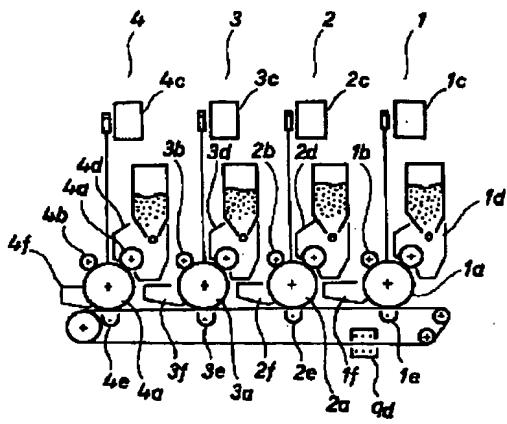


5, 6, 7, 8...画像形成ユニット	5g, 6g, 7g, 8g...残像トナリ分散化手段
5a, 6a, 7a, 8a...増幅保持体	5d, 6d, 7d, 8d...選像ローラ
5b, 6b, 7b, 8b...増幅手段	9...搬送手段
5c, 6c, 7c, 8c...増幅手段	9a...駆動ベルト
5d, 6d, 7d, 8d...選像手段	9a...ベルトクリーナ
5e, 6e, 7e, 8e...増幅増倍器	9c...ベルト増倍器
5f, 6f, 7f, 8f...増倍ランプ	

[Drawing 2]



[Drawing 3]



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[Translation done.]



くとも1個のクリーナーレス画像形成ユニットを配置する必要がある。つまり、カラー画像形成する機能面およびコンパクト化の点で、初期の目的を達成し得ないからである。

【0018】又、上記構成のカラー画像形成装置では、実質的に透明なエンドレス状のベルト9aの内側に除電ランプ5f, 6f, 7f, 8f を配置したか、本発明ではこの構成に限定されるものでなく、除電ランプ5f, 6f, 7f, 8f をエンドレス状のベルト9aの外側に配置して、エンドレス状のベルト9aを不透明としてもよい。しかしながら、上記したような構成を採ることによって、エンドレス状のベルト9aの内側を利用した効率的な配置が可能となり、カラー画像形成装置の一層のコンパクト化を実現できる。

#### 【0019】

【発明の効果】以上説明したように本発明に係るカラー画像形成装置によれば、転写残りトナーのクリーニング手段の省略化、これによる構成の簡略化やコンパクト化が効果的に達成されるばかりでなく、高精度な11通正に静電潜像形成・同時現像および非画像部のトナー回収・クリーニングをなし得るため、鮮鋭ないし鮮明で高品質のカラー画像を常に形成し得る。

#### 【図面の簡単な説明】

【図1】本発明に係るカラー画像形成装置の要部構成例を示す断面図。

【図2】本発明に係るカラー画像形成装置の要部構成例におけるクリーナーレス画像形成ユニットを拡大して示す断面図。

【図3】従来のカラー画像形成装置の要部構成を示す断面図。

#### 【符号の説明】

- 1, 2, 3, 4...画像形成ユニット 1a, 2a, 3a, 4a, 5a, 6a, 7a, 8a...潜像保持体 1b, 2b, 3b, 4b, 5b, 6b, 7b, 8b...帯電手段 1c, 2c, 3c, 4c, 5c, 6c, 7c, 8c...静電潜像形成手段 1d, 2d, 3d, 4d, 5d, 6d, 7d, 8d...現像手段 1e, 2e, 3e, 4e, 5e, 6e, 7e, 8e...転写手段 1f, 2f, 3f, 4f...クリーニング手段 5f, 6f, 7f, 8f...除電ランプ 5g, 6g, 7g, 8g...転写残りトナーの分散化手段 5, 6, 7, 8...クリーナーレス画像形成ユニット 5d<sub>1</sub>, 6d<sub>1</sub>, 7d<sub>1</sub>, 8d<sub>1</sub>...トナー担持体5d<sub>2</sub>, 6d<sub>2</sub>, 7d<sub>2</sub>, 8d<sub>2</sub>...トナー一体給体 5d<sub>3</sub>, 6d<sub>3</sub>, 7d<sub>3</sub>, 8d<sub>3</sub>...トナー回取ブレード 5d<sub>4</sub>, 6d<sub>4</sub>, 7d<sub>4</sub>, 8d<sub>4</sub>...トナー貯槽 9...転写材搬送手段 9a...ベルト 9b...回転機構 9c...ベルトクリーナ 9d...定着ユニット 10...給紙ローラ 11...定着ユニット 12...クリーナーレス画像形成ユニット間の仕切板

するベルトクリーナ9cおよび走行するベルト9aに所用の帯電を付与するベルト帯電器9dにて構成されており、また、11は前記転写材に転写されたトナー像を転写紙面に定着する定着ユニット、12は各クリーナーレス画像形成ユニット5, 6, 7, 8間の仕切板である。

【0011】本発明に係るカラー画像形成装置の構成要素を成すクリーナーレス画像形成ユニット5, 6, 7, 8における現像手段5d, 6d, 7d, 8dの構成および機能について説明すると、潜像保持体5a, 6a, 7a, 8a 面に対峙させて配置された両面にトナー層を担持するローラ型のトナー担持体5d<sub>1</sub>, 6d<sub>1</sub>, 7d<sub>1</sub>, 8d<sub>1</sub>、このトナー担持体5d<sub>1</sub>, 6d<sub>1</sub>, 7d<sub>1</sub>, 8d<sub>1</sub> 面にトナーを供給するトナー一体給体5d<sub>2</sub>, 6d<sub>2</sub>, 7d<sub>2</sub>, 8d<sub>2</sub>、前記のトナー担持体5d<sub>1</sub>, 6d<sub>1</sub>, 7d<sub>1</sub>, 8d<sub>1</sub> 面に担持されるトナー層の厚さを規制するトナー層規制ブレード5d<sub>3</sub>, 6d<sub>3</sub>, 7d<sub>3</sub>, 8d<sub>3</sub>、上記の潜像保持体5a, 6a, 7a, 8a の静電潜像面へトナーを供給した後のトナー担持体5d<sub>1</sub>, 6d<sub>1</sub>, 7d<sub>1</sub>, 8d<sub>1</sub> 面のトナーを回収するトナー回収ブレード5d<sub>4</sub>, 6d<sub>4</sub>, 7d<sub>4</sub>, 8d<sub>4</sub> およびこれらに装着しながらトナーを行留するトナー貯槽5d<sub>5</sub>, 6d<sub>5</sub>, 7d<sub>5</sub>, 8d<sub>5</sub> を具備している。

#### 【0012】

次に、このクリーナーレス画像形成ユニット5, 6, 7, 8における現像・同時クリーニングについて概略を説明する。静電潜像形成手段5c, 6c, 7c, 8c によって潜像保持体5a, 6a, 7a, 8a 面に静電潜像を形成したとき、帯電部分（すなわち未露光部もしくは非画像部）に存在する転写残りトナーは、帯電手段5b, 6b, 7b, 8b によって確実に帯電されているため、トナー担持体5d<sub>1</sub>, 6d<sub>1</sub>, 7d<sub>1</sub>, 8d<sub>1</sub> から潜像保持体5a, 6a, 7a, 8a 面へトナーが転移することを抑制する電界、すなわち帯電部分の電位差によって電界によってトナー担持体5d<sub>1</sub>, 6d<sub>1</sub>, 7d<sub>1</sub>, 8d<sub>1</sub> 側へ転移する。同時に非帯電部分、すなわち露光部もしくは非画像部に存在する転写残りトナーは、トナー担持体5d<sub>1</sub>, 6d<sub>1</sub>, 7d<sub>1</sub>, 8d<sub>1</sub> 側へ転移する。この非帯電部分には、トナー担持体5d<sub>1</sub>, 6d<sub>1</sub>, 7d<sub>1</sub>, 8d<sub>1</sub> から潜像保持体5a, 6a, 7a, 8a 面上に残留する。この非帯電部分には、トナー担持体5a<sub>1</sub>, 6a<sub>1</sub>, 7a<sub>1</sub>, 8a<sub>1</sub> から新たなトナーが転移し、現像と同時にクリーニングが行われる。

【0013】上記構成のカラー画像形成装置によれば、先ずイエロー画像に対応する情報によって、潜像保持体（感光体）5a面に所要の静電潜像パターンが形成され、次の現像手段dにて、前記したような作用原理によって現像・同時クリーニングが行われ、潜像保持体5a面には前記の静電潜像パターンに対応したトナー像が形成される。このようにして形成されたトナー像は、潜像保持体5a面から転写手段5eで周期的に搬送されてくる転写材面に転写される。この転写後、潜像保持体5a面は、除電ランプ5fにて、この転写された帯電が除去されてから、転写残りトナーの分散化手段5gによりほぼ均一に分散され、潜像保持体5a面の一掃化が図られて再度イエロー画像に

くとも1個を、転写後潜像保持体面に残留する転写残りトナーを現像手段によってクリーニングするように構成されたクリーナーレス画像形成ユニットとしたことにより、画像形成部がコンパクト化され、カラー画像形成装置自体の小形化を図り得る。つまり、画像形成ユニットのうち少なくとも1個は、現像・同時クリーニングの構成を成し、クリーニング手段を別設しないため、そのクリーニング手段が占有する空間的な容積を省略し得ることとなる。しかも、前記クリーナーレス画像形成ユニットにおいては、転写残りトナーもトナー貯槽に回収されて再利用されるので、効率的なトナーの利用が図られる。

#### 【0008】

【実施例】以下図1および図2を参照して本発明の実施例を説明する。

【0009】図1は、本発明に係るカラー画像形成装置の要部構成（画像形成部）例を断面的に、また図2は画像形成部の1個（クリーナーレス画像形成ユニット）を拡大して断面的に示すものである。この画像形成部は、たとえばイエロー用のクリーナーレス画像形成ユニット5、マゼンタ用のクリーナーレス画像形成ユニット6、シアン用のクリーナーレス画像形成ユニット7、およびブラック用のクリーナーレス画像形成ユニット8で構成されている。また、これらの各クリーナーレス画像形成ユニット5, 6, 7, 8の構成は、いずれも潜像保持体（たとえば感光体ドラム）5a, 6a, 7a, 8a、前記潜像保持体5a, 6a, 7a, 8a 面を一緒に帯電させる帯電手段（たとえばコロナ帯電器）5b, 6b, 7b, 8b、別設されている画像化処理部（図1示す）からの画像情報に基づいて帯電手段5c, 6c, 7c, 8c、前記静電潜像形成手段5d, 6d, 7d, 8d、前記トナー像をトナー像化して転写させる転写手段5e, 6e, 7e, 8e、前記トナー像を転写材面に転写させる転写手段5f, 6f, 7f, 8f、および前記転写後残留した転写残りトナーを潜像保持体5a, 6a, 7a, 8a 面において分散化して前記帯電手段5b, 6b, 7b, 8b による帯電の一掃化に寄与するとともに、現像手段5d, 6d, 7d, 8d でのクリーニング作用を助長する転写残りトナーの分散化手段5g, 6g, 7g, 8gを具備した構成を成している。つまり、使用する着色色トナーを異ならせているが、いわゆるクリーナーレス画像形成装置（ユニット）5, 6, 7, 8を連続的に配置した構成を採っている。

【0010】なお、図1において9はトナー像を転写する転写材を搬送する転写手段で、たとえば給紙ローラ10から前記画像形成に連動して供給される転写紙を、順次搬送する実質的に透明なエンドレス状のベルト9a、このベルト9aをエンドレスに走行させる回転機構（ローラなど）9b、走行するベルト9a面をクリーニング

【図1】

